Claims

We claim:

1. An assay apparatus comprising a surface having at least one discreet assay region, said discrete assay region comprising at least one cell seeding region and at least one test compound formulated for controlled release.

2. The assay apparatus of Claim 1, wherein said test compound formulated for controlled release is provided in a matrix.

3. The assay apparatus of Claim 1, wherein said matrix is a polymer.

4. The assay apparatus of Claim 1, wherein said matrix is selected from the group consisting of chitosan, chitosan-alginate, poly(N-isopropylacrylamide) hydrogels, lipid microspheres, copolymers of polylactic and polyglycolic acid, dextran hydrogels, and poly(ethylene glycol) hydrogels.

5. The assay apparatus of Claim 3, wherein said matrix further comprises an extracellular matrix component.

6. The assay apparatus of Claim 5, wherein said extracellular matrix component is selected from the group consisting of collagen, vitronectin, fibronectin, and laminin.

7. The assay apparatus of Claim 1, wherein said cell seeding region comprises an extracellular matrix component.

8. The assay apparatus of Claim 1, wherein said test compound is selected from the group consisting of polypeptides, sugars, amino-acids and small molecule organic compounds.

9. The assay apparatus of Claim 8, wherein said polypeptides are selected from the group consisting of integrin binding sequences and growth factors.

10. The apparatus of Claim 8, wherein said sugars are selected from the group consisting of glucose, fructose, sucrose, galactose and derivatives thereof.

11. The apparatus of Claim 8, wherein said small molecule organic compounds are selected from the group consisting of steroids, immunomodulators, hormones, antineoplastic drugs, antimetabolites, chemotherapeutic agents, antimicrobial druds, NSAIDs, vasodialators, beta-adrenergic blockers, diuretics, anesthetics, antidepressants, sedatives, tranquilizers, vasoconstrictors, anti-ulcer drugs, stimulants, antihypertensive drugs and cholesterol lowering drugs.

12. The apparatus of Claim 1, wherein said assay regions are configured for readouts selected from the group consisting of colorimetric, fluorimetric, optical density, and light scattering readouts.

13. The apparatus of Claim 1, wherein said at least one cell seeding region contains at least one cell.

14. The apparatus of Claim 1, wherein said at least one assay region is configured to orient mesogens.

15. The apparatus of Claim 1, further comprising at least one reservoir.

16. The apparatus of Claim 1, wherein said test compound is suspected of promoting or inhibiting movement of said at least one cell.

17. The apparatus of Claim 15, wherein said at least one reservoir is fluidically connected to at least one microfluidic channel.

18. The apparatus of Claim 15, wherein said at least one reservoir fluidically contacts said at least one assay region.

19. The apparatus of Claim 1, comprising 6, 12, 24, 36, 96, 384, or 1536 assay regions.

20. The apparatus of Claim 19, wherein said 6, 12, 24, 36, 96, 384, or 1536 of said assay regions are arranged in an array of a plurality of rows and columns.

21. The apparatus of Claim 20, wherein said array of said assay regions is configured to correspond to the reading positions of a plate reader device.

22. The apparatus of Claim 1, comprising two or more test compounds formulated for controlled release.

23. The apparatus of Claim 2, further comprising at least one well having bottom and side surfaces, wherein said at least one discreet assay region is located on said bottom surface of said well, and wherein said matrix is located in said well.

24. The apparatus of Claim 23, wherein said matrix is located on said side surface of said well.

25. The apparatus of Claim 23, wherein said matrix is located on the bottom of said well.

26. The apparatus of Claim 23, wherein said matrix is located in a discrete resion of said well.

27. The apparatus of Claim 26, wherein said discrete region is on the bottom of said well.

28. The apparatus of Claim 26, wherein said discrete region is on the side of said well.

29. A method comprising

a) providing cells and an assay apparatus comprising a surface having at least one discreet assay region, said discrete assay region comprising at least one cell seeding region and at least one test compound formulated for controlled release;

b) contacting said cell seeding region with said cells;

c) culturing said cells under conditions that said test compound is released; and

d) assaying the response of said cells to said test compound.

30. The method of Claim 29, wherein said surface comprises a plurality of discrete assay regions arranged in an array.

31. The method of Claim 29, wherein said surface comprises about 6, 12, 24, 36, 96, 384, or 1536 assay regions.

32. The method of Claim 31, wherein said about 6, 12, 24, 36, 96, 384, or 1536 assay regions are arranged in an array of a plurality of rows and columns.

33. The method of Claim 30, wherein said array of said assay regions is configured to correspond to the reading positions of a plate reader device.

34. The method of Claim 29, wherein said test compound formulated for controlled release is provided in a matrix.

35. The method of Claim 29, wherein said matrix is a polymer.

36. The method of Claim 29, wherein said matrix is selected from the group consisting of chitosan, chitosan-alginate, poly(N-isopropylacrylamide) hydrogels, lipid microspheres, copolymers of polylactic and polyglycolic acid, dextran hydrogels, and poly(ethylene glycol) hydrogels.

37. The method of Claim 36, wherein said matrix further comprises an extracellular matrix component.

38. The method of Claim 37, wherein said extracellular matrix component is selected from the group consisting of collagen, vitronectin, fibronectin, and laminin.

39. The method of Claim 29, wherein said cell seeding region comprises an extracellular matrix component.

40. The method of Claim 29, wherein said test compound is selected from the group consisting of polypeptides, sugars, amino acids and small molecule organic compounds.

41. The method of Claim 40, wherein said polypeptides are selected from the group consisting of integrin binding sequences and growth factors.

42. The method of Claim 40, wherein said sugars are selected from the group consisting of glucose, fructose, sucrose, galactose and derivatives thereof.

43. The method of Claim 29, wherein said small molecule organic compounds are selected from the group consisting of steroids, immunomodulators, hormones, antineoplastic drugs, antimetabolites, chemotherapeutic agents, antimicrobial druds, NSAIDs, vasodialators, beta-adrenergic blockers, diuretics, anesthetics, antidepressants, sedatives, tranquilizers, vasoconstrictors, anti-ulcer drugs, stimulants, antihypertensive drugs and cholesterol lowering drugs.

44. The method of Claim 29, wherein said assay regions are configured for readouts selected from the group consisting of colorimetric, fluorimetric, optical density, and light scattering readouts.

45. The method of Claim 29, wherein said at least one cell seeding region contains at least one cell.

46. The method of Claim 29, wherein said at least one assay region is configured to orient mesogens.

47. The method of Claim 29, further comprising at least one reservoir.

48. The method of Claim 29, wherein said test compound is suspected of promoting or inhibiting movement of said at least one cell.

49. The method of Claim 48, wherein said at least one reservoir is fluidically connected to at least one microfluidic channel.

50. The method of Claim 48, wherein said at least one reservoir fluidically contacts said at least one assay region.

51. The method of Claim 34, wherein said assay apparatus further comprises at least one well having bottom and side surfaces, wherein said at least one discreet assay region is located on said bottom surface of said well, and wherein said matrix is located in said well.

52. The method of Claim 51, wherein said matrix is located on said side surface of said well.

53. The method of Claim 51, wherein said matrix is located on the bottom of said well.

54. The method of Claim 51, wherein said matrix is located in a discrete region of said well.

55. The method of Claim 51, wherein said discrete region is on the bottom of said well.

56. The method of Claim 51, wherein said discrete region is on the side of said well.

57. A kit comprising:

a) an assay apparatus comprising a surface having at least one discreet assay region, said discrete assay region comprising at least one cell seeding region;

b) unpolymerized matrix material; and

c) instructions for polymerizing said matrix material in the presence of said at least one test compound, applying said matrix material to said assay apparatus, and culturing cells in said assay apparatus.

58. The kit of Claim 57, wherein said surface comprises a plurality of discrete assay regions arranged in an array.

59. The kit of Claim 57, wherein said surface comprises about 6, 12, 24, 36, 96, 384, or 1536 assay regions.

60. The kit of Claim 59, wherein said about 6, 12, 24, 36, 96, 384, or 1536 assay regions are arranged in an array of a plurality of rows and columns.

61. The kit of Claim 58, wherein said array of said assay regions is configured to correspond to the reading positions of a plate reader device.

62. The kit of Claim 57, wherein said test compound formulated for controlled release is provided in a matrix.

63. The kit of Claim 57, wherein said unpolymerized matrix material is selected from the group consisting of chitosan, chitosan-alginate, poly(N-isopropylacrylamide) hydrogels, lipid microspheres, copolymers of polylactic and polyglycolic acid, dextran hydrogels, and poly(ethylene glycol) hydrogels.

64. The kit of Claim 63, wherein said unpolymerized matrix material further comprises an extracellular matrix component.

65. The kit of Claim 64, wherein said extracellular matrix component is selected from the group consisting of collagen, vitronectin, fibronectin, and laminin.

66. The kit of Claim 57, wherein said cell seeding region comprises an extracellular matrix component.

67. The kit of Claim 57, wherein said test compound is selected from the group consisting of polypeptides, sugars, amino acids and small molecule organic compounds.

68. The kit of Claim 67, wherein said polypeptides are selected from the group consisting of integrin binding sequences and growth factors

69. The kit of Claim 67, wherein said sugars are selected from the group consisting of glucose, fructose, sucrose, galactose and derivatives thereof.

70. The kit of Claim 57, wherein said small molecule organic compounds are selected from the group consisting of steroids, immunomodulators, hormones, antineoplastic drugs, antimetabolites, chemotherapeutic agents, antimicrobial druds, NSAIDs, vasodialators, beta-adrenergic blockers, diuretics, anesthetics, antidepressants, sedatives, tranquilizers, vasoconstrictors, anti-ulcer drugs, stimulants, antihypertensive drugs and cholesterol lowering drugs.

71. The kit of Claim 57, wherein said assay regions are configured for readouts selected from the group consisting of colorimetric, fluorimetric, optical density, and light scattering readouts.

72. The kit of Claim 57, wherein said at least one assay region is configured to orient mesogens.

74. The kit of Claim 57, further comprising at least one reservoir.

75. The kit of Claim 57, wherein said test compound is suspected of promoting or inhibiting movement of said at least one cell.

76. The kit of Claim 74, wherein said at least one reservoir is fluidically connected to at least one microfluidic channel.

77. The kit of Claim 76, wherein said at least one reservoir fluidically contacts said at least one assay region.

78. The kit of Claim 57, wherein said assay apparatus further comprises at least one well having bottom and side surfaces, wherein said at least one discreet assay region is located on said bottom surface of said well.

79. A device for facilitating the seeding of cells in a multiwell plate comprising a plurality of cylinders sized to be inserted into individual wells of a multiwell plate, said cylinders movably connected to at least one horizontal member so that said cylinders can be positioned in individual wells in said multiwell plate.

80. The device of Claim 79, wherein said movable connection allows for horizontal movement of said cylinders.

81. The device of Claim 80, wherein said moveable connection allowed for vertical movement of said cylinders.

82. The device of Claim 79, wherein said cylinders are sized to be inserted into a well of a multiwell plate selected from the group consisting of 6, 12, 24, 36, 96, 384, or 1536 well multiwell plates.

83. A device for facilitating the seeding of cells in a multiwell plate comprising an inserted sized to be inserted into individual wells of multiwell plate, said insert comprising a substantially circular surface having therein an opening so that when said insert is positioned in said well the bottom surface of said well is exposed by said opening in said insert, said insert further comprising lift piece so that said insert can be lifted from said well.

84. The device of Claim 83, wherein said inserts are sized to be inserted into a well of a multiwell plate selected from the group consisting of 6, 12, 24, 36, 96, 384, or 1536 well multiwell plates.

85. A method of assaying cell migration comprising:

a) providing cells and an assay device;

b) seeding cells in a discreet area of said assay device;

c) assaying cell movement with a plate reading device.

86. The method of Claim 85, wherein said assay device is a multiwell plate.

87. The method of Claim 85, wherein said assay device is a slide comprising multiple discreet assay regions.

88. The method of Claim 85, wherein said plate reading device assays the presence of cells within discrete regions of said assay device.

89. The method of Claim 88, wherein said discrete regions are concentric circles.

90. The method of Claim 86, wherein said multiwell plate comprises asymmetrically masked wells.

91. The method of Claim 86, wherein said plate reader asymmetrically samples individual wells in said multiwell plate.

92. The method of Claim 87, wherein said multiple discreet assay regions are asymmetrically masked.

93. The method of Claim 87, wherein said plate reader asymmetrically samples individual assay regions on said slide.

94. A method of analyzing surfaces comprising:

a) providing a plate reading device and an article having a coated surface;

b) with said plate reader device, measuring optical density at multiple discreet regions on said coated surface; and

c) comparing the optical density at said multiple discreet regions to determine the uniformity of said coated surface.

95. The method of Claim 94, further comprising discarding articles that have less than a predetermined threshold of uniformity.

96. The method of Claim 94, wherein said plate reading device is configured to provide readings from about 6 to about 2000 discreet regions.

97. The method of Claim 94, further comprising presenting said comparisons graphically.